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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,145	01/21/2005	Kenji Yamada	122432	3642

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EXAMINER	
BEHM, HARRY RAYMOND	
ART UNIT	**PAPER NUMBER**
2838	

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/523,145	YAMADA, KENJI	
	Examiner	Art Unit	
	Harry Behm	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-8,10,15-17,19,23-25 and 27* is/are rejected.

7)☒ Claim(s) *5,9,11-14,18,20-22,26 and 28-30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/21/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 1-30 are objected to because of the following informalities detailed below. Appropriate correction is required.

With respect to Claims 1, 15 and 23 "a follow up property" and "a reference property" are not defined in the claims. For the purpose of examination, these are interpreted to mean an inherent property and a reference, respectively.

With respect to Claims 2, 16 and 24 "a chopper circuit" is not defined in the claims. For the purpose of examination it is assumed to mean a DC-DC converter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-8, 10, 15-17, 19, 23-25 and 27 rejected under 35 U.S.C. 102(b) as being anticipated by Sawtell (US 5,949,225).

With respect to Claim 1, Sawtell discloses a voltage conversion apparatus converting a direct current voltage from a DC power supply (Fig. 1 Vs) into an output voltage (Fig. 1 Vo) such that said output voltage is equal to a designated voltage (Fig. 1 Vref), comprising: a voltage converter (Fig. 1) altering a voltage level of said direct current voltage (Fig. 1 Vs) to provide an output voltage (Fig. 1 Vo), a detection unit (Fig.

3 312) detecting the output voltage (Fig. 1 Vo) output from said voltage converter, and a control unit (Fig. 3 300, Fig. 1 122) controlling said voltage converter such that a follow-up property [voltage] of said output voltage (Fig. 3 Vout) with respect to said designated voltage (Fig. 3 Vref) in feedback control is consistent with a reference property [reference voltage], and said output voltage (Fig. 3 Vout) is equal [Vfb equals Vref in steady state] to said designated voltage (Fig. 3 Vref), based on said detected output voltage (Fig. 3 Vfb) and said designated voltage (Fig. 3 Vref).

With respect to Claim 2, Sawtell discloses the voltage conversion apparatus according to claim 1, wherein said voltage converter (Fig. 1) includes a chopper circuit (Fig. 1 100), said control unit (Fig. 3 300, Fig. 1 122) comprises a feedback voltage control value calculation unit (Fig. 3 300) detecting a difference (Fig. 3 Vc') between said output voltage (Fig. 3 Vfb) and said designated voltage (Fig. 3 Vref) to determine a control gain [gain of 316] in said feedback control in accordance with the detected difference (Fig. 3 Vc'), and calculating a feedback voltage control value (Fig. 3 338) in said feedback control such that said follow-up property [output voltage] is equal [equal in steady state] to said reference property [reference voltage] based on the determined control gain [gain of 316], said output voltage (Fig. 3 Vout], and said difference (Fig. 3 Vc'), a duty ratio calculation unit (Fig. 1 122) calculating a switching duty ratio (Fig. 1 D) of said chopper circuit (Fig. 1 100), based on said calculated feedback voltage control value (Fig. 3 Vc'), and a switching signal generation unit (Fig. 1 112) generating a switching signal (Fig. 1 112 ouput) having said switching duty ratio (Fig. 1 D), and providing the generated switching signal to said chopper circuit (Fig. 1 100).

With respect to Claim 3, Sawtell discloses the voltage conversion apparatus according to claim 2, wherein said feedback voltage control value calculation unit (Fig. 3 300) calculates said feedback voltage control value (Fig. 3 338) by correcting a feedback preliminary voltage (Fig. 3 ILed) control value calculated using said control gain [gain 316] such that said follow-up property [voltage] is equal [in steady state] to said reference property [reference voltage].

With respect to Claim 4, Sawtell discloses the voltage conversion apparatus according to claim 3, wherein said feedback voltage control value calculation unit comprises a subtracter (Fig. 3 326) calculating a difference (Fig. 3 Vc') between said output voltage (Fig. 3 Vfb) and said designated voltage (Fig. 3 Vref), a gain determination unit (Fig. 3 316) determining said control gain [gain 316] based on said difference (Fig. 3 Vc'), a computing element (Fig. 3 316) calculating said feedback preliminary voltage control value (Fig. 3 ILed) based on said determined control gain [gain 316], and a corrector (Fig. 3 310) correcting said feedback preliminary voltage control value (Fig. 3 ILed) by converting said output voltage (Fig. 3 Vout) into a reference voltage (Fig. 3 Vfb) where said follow-up property [output voltage] is equal to said reference property [reference voltage Vref] to output said feedback voltage control value (Fig. 3 338).

With respect to Claim 6, Sawtell discloses the voltage conversion apparatus according to claim 2, wherein said feedback voltage control value calculation unit (Fig. 3 300) calculates said feedback voltage control value (Fig. 3 338) by correcting said difference (Fig. 3 Vc') such that said follow-up property [output voltage] is equal [in

steady state] to said reference property [reference voltage].

With respect to Claim 7, Sawtell discloses the voltage conversion apparatus according to claim 6, wherein said feedback voltage control value calculation unit (Fig. 3 300) comprises a subtracter (Fig. 3 326) calculating a difference (Fig. 3 Vc') between said output voltage (Fig. 3 Vfb) and said designated voltage (Fig. 3 Vref), a corrector (Fig. 3 306) correcting said difference such that said follow-up property [voltage] is equal [in steady state] to said reference property [reference voltage], a gain determination unit (Fig. 3 316) determining said control gain [gain of 316] based on said difference (Fig. 3 Vc'), and a computing element (Fig. 3 302) calculating said feedback voltage control value (Fig. 3 338) based on said determined control gain (Fig. 3 316 gain] and said corrected difference (Fig. 3 Vc').

With respect to Claim 8, Sawtell discloses the voltage conversion apparatus according to claim 7, wherein said corrector (Fig. 3 306) corrects said difference by converting said output voltage (Fig. 3 Vout) into a reference voltage (Fig. 3 Vref) where said follow-up property [output voltage] is equal to said reference property [reference voltage].

With respect to Claim 10, Sawtell discloses the voltage conversion apparatus according to claim 1, wherein said voltage converter (Fig. 1) includes of a chopper circuit (Fig. 1 100), said control unit (Fig. 3 300, Fig. 1 122) comprises a feedback voltage control value calculation unit (Fig. 3 300) detecting a difference (Fig. 3 Vc') between said output voltage (Fig. 3 Vfb) and said designated voltage (Fig. 3 Vref) to determine a control gain [gain of 316] in said feedback control in accordance with the

detected difference (Fig. 3 Vc'), and calculating a feedback preliminary voltage control value (Fig. 3 ILED) in said feedback control based on the determined control gain [gain of 316], said output voltage (Fig. 3 Vfb), and said difference (Fig. 3 Vc'), a duty ratio calculation unit (Fig. 1 122) calculating a switching duty ratio (Fig. 1 D) of said chopper circuit (Fig. 1 100) such that said follow-up property [voltage] is equal to said reference property [reference voltage], based on said calculated feedback preliminary voltage control value (Fig. 3 ILED) and said output voltage, and a switching signal generation unit (Fig. 1 112) generating a switching signal (Fig. 1 112) having said switching duty ratio (Fig. 1 D), and providing the generated switching signal to said chopper circuit (Fig. 1 100).

With respect to Claims 15 and 23, Sawtell discloses a voltage conversion method of converting a direct current voltage (Fig. 1 Vin) from a DC power supply (Fig. 1 Vs) into an output voltage (Fig. 1 Vo) under feedback control such that said output voltage is equal to a designated voltage (Fig. 1 Vref), said method comprising [note the preamble is not explicitly claimed and will not be given weight, so claims 23-30 are treated as claims 15-23, respectively]: a first step of detecting said output voltage (Fig. 3 312), a second step of detecting a difference between said designated voltage and said output voltage (Fig. 3 326), a third step of determining a control gain in accordance with said detected difference (Fig. 3 316), and a fourth step of converting said direct current voltage (Fig. 1 Vin) into said output voltage (Fig. 3 Vout) such that a follow-up property [voltage] of said output voltage (Fig. 3 Vout) with respect to said designated voltage (Fig. 3 Vref) in said feedback control is consistent with a reference property [reference

voltage], and said output voltage (Fig. 3 Vout) is equal [Vfb equals Vref in steady state] to said designated voltage (Fig. 3 Vref), based on said determined control gain [gain of 316], said detected difference (Fig. 3 Vc'), and said detected output voltage (Fig. 3 Vfb).

With respect to Claims 16 and 24, Sawtell discloses the voltage conversion method as set forth above, wherein said direct current voltage (Fig. 1 Vs) being converted into said output voltage (Fig. 3 Vout) by a chopper circuit (Fig. 1 100), said fourth step comprises a first substep of calculating a feedback voltage control value (Fig. 3 338) that causes said follow-up property [voltage] to match said reference property [reference voltage] in said feedback control, based on said control gain [gain 316], said difference (Fig. 3 Vc'), and said output voltage (Fig. 3 Vfb), a second substep of calculating a switching duty ratio (Fig. 1 D) of said chopper circuit (Fig. 1 100) using said feedback voltage control value (Fig. 3 316), and a third substep of controlling said chopper (Fig. 1 100) circuit such that said output voltage (Fig. 3 Vfb) is equal to said designated voltage (Fig. 3 Vref), based on said switching duty ratio (Fig. 1 D).

With respect to Claim 17 and 25, Sawtell discloses the voltage conversion method as set forth above, wherein said first substep includes the step of calculating a feedback preliminary voltage control value (Fig. 3 ILED) in said feedback control based on said control gain (Fig. 3 316) and said difference (Fig. 3 Vc'), and the step of calculating said feedback voltage control value (Fig. 3 338) by correcting said feedback preliminary voltage control value (Fig. 3 ILED) using said output voltage (Fig. 3 Vfb).

With respect to Claims 19 and 27, Sawtell discloses the voltage conversion method as set forth above, wherein said first substep includes the step of calculating a

correction difference (Fig. 3 Vc') where said follow-up property [voltage] is equal to said reference property [reference voltage] by correcting said difference (Fig. 3 Vc') using said output voltage (Fig. 3 Vfb), and the step of calculating said feedback voltage control value (Fig. 3 338) based on said control gain [gain 316] and said correction difference (Fig. 3 Vc').

Allowable Subject Matter

Claims 5, 9 and objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcoming the claim objections to terminology not being defined in the claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, wherein said corrector calculates a ratio of said reference voltage to said output voltage, and multiplies the calculated result.

Claims 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcoming the claim objections to terminology not being defined in the claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose or suggest, in combination with the limitations of

the base claim and any intervening claims, primarily, wherein said duty ratio calculation unit calculates said switching duty ratio by correcting a preliminary duty ratio.

Claims 18, 20, 26 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcoming the claim objections to terminology not being defined in the claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, the step of multiplying said feedback preliminary voltage control value by said conversion ratio to calculate said feedback voltage control value.

Claims 21-22 and 29-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and overcoming the claim objections to terminology not being defined in the claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art does not disclose or suggest, in combination with the limitations of the base claim and any intervening claims, primarily, a third substep of correcting said preliminary switching duty ratio using said output voltage to calculate a switching duty ratio where said follow-up property is equal to said reference property

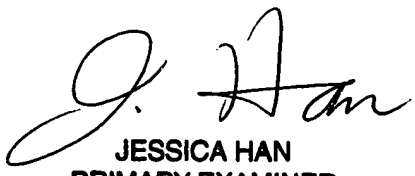
Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Scutten (US 4,969,076) discloses a voltage converter where the gain of the error voltage is a function of output load conditions. Haas (US 6,664,769) discloses a voltage converter where the error voltage controls a variable resistance gain. Hwang (US 6,657,417) discloses where the gain of the error amplifier is a function of the error signal frequency. Schultz (US 6,411,071) discloses a voltage converter where the voltage error changes the integrator gain. Wrathall (US 5,889,393) and Maksimovic (US 5,867,379) disclose where the gain changes as a function of the error voltage. Criscione (US 6,225,794) discloses a voltage converter where fuzzy logic alters the voltage error.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Behm whose telephone number is 571-272-8929. The examiner can normally be reached on Business EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on 571-2721989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



JESSICA HAN
PRIMARY EXAMINER